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ABSTRACT

The purpose of this study is to investigate the use of an online discussion forum to support practicing elementary school teachers' professional development in mathematics. The forum is structured around teachers' sharing, discussing, and reflection upon the teaching of elementary mathematics. Third grade teachers (N=14) from three different school systems took part in the online discussion forum. This study provided insight into not only how these teachers make sense of teaching mathematics, but also how they support and share with each other as a learning community. (Contains 36 references.) (ASK)

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How Might an Online Discussion Forum Support Teachers' Professional Development in Mathematics?: A First Look

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Introduction to the Problem

A common problem for teachers is a need for time and support to work with other teachers to further their professional development (Loucks-Horsley, Hewson, Love, & Stiles, 1998). Much professional development for teachers consists of mandated, short-term workshops that identify others as the sources of knowledge which must be transmitted to teachers. New directions in professional development indicate a need for more emphasis on experiential learning, reflection on teachers' own teaching practices, collaborative learning, and problem-focused learning (Loucks-Horsley, 1995; Sparks, 1994). This type of interactive professional development recognizes the expertise of teachers, yet provides opportunities for them to challenge their ideas and insights for professional growth.

One way that teachers connect with other teachers is by telling stories from their professional lives. Clandinin & Connelly (1995) describe three human desires central to professional life: the desire to tell stories, the desire for relationship, and the desire to reflect or think again. All these desires are embedded in telling "reflective relational stories," and illustrate the importance of reflection in the professional lives of teachers. Reflection by teachers on their professional lives places teachers in the active role of taking responsibility for their own professional development, rather than being considered the recipients of knowledge generated by "experts" elsewhere. Teachers generate new knowledge about teaching and, through their ideas, beliefs, and theories, they can contribute to the professional lives of others (Zeichner and Liston, 1996).

Purpose of the Study

Although participating in discussions may lead to increased reflection for teachers (Zeichner and Liston, 1996), physical proximity is necessary for this connection. Because time is a factor for most teachers, traveling to meet in face-to-face discussion groups can be a barrier to participation. The use of technology may facilitate the connection of teachers who are separated by distance. Recently, the use of asynchronous computer-mediated communication in the form of online discussion forums has been shown to have a positive impact on the professional development of teachers (DeWert, Babinski, & Jones, 1998).

The purpose of this study is to investigate the use of an online discussion forum to support practicing elementary school teachers' professional development in mathematics. This forum is structured around teachers' sharing, discussing, and reflecting on the teaching of elementary mathematics. Participating teachers are taking part in a year-long professional development program that consists of a series of workshops and seminars

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focused on teachers understanding students' thinking to make instructional decisions in mathematics. The goals of this project are:

- to understand children's mathematical thinking so that teachers can assess the impact of their instruction, focusing on the use of story/word problems and children talking about work with number, and
- to develop a set of goals for grades K-5 about what should happen when taking into account children's mathematical development and linking this work to the North Carolina Standard Course of Study.

Third grade teachers from three different participating school systems (14 total teachers) are taking part in the online forum to discuss issues, questions, and experiences regarding the implementation of the professional development program. Data collection and analysis makes use of the archived online discussions, quantitative forum usage data, a questionnaire dealing with the teachers' professional and technological experience, and interviews with a random sample of participants. The data will be applied to these guiding research questions:

How can an online discussion forum support the professional development of elementary teachers in the teaching of mathematics?

I. What is the nature of the online participation?

Quantitative usage data provide a foundation for understanding this question. Data illustrating the timing, frequency, and volume of online activity are being analyzed, resulting in a descriptive profile of the online discussion forum.

The messages are also being examined for emerging themes regarding the general topics of the postings. This categorization of topics will add to the descriptive profile of the discussion forum, providing an overview of the topics addressed by the participants.

II. What are the teachers' perceptions of the effectiveness of the online discussion forum?

Interview data will be analyzed to uncover teachers' perceptions of the discussion forum through a "cross-case analysis" (Patton, 1990, p. 376), which involves grouping and analyzing responses from different people to similar questions and finding different perspectives on central issues. These data will be triangulated with relevant evidence from the questionnaire and participants' online messages to build a description of the discussion forum from the perspective of the participants, possibly illustrating teachers' perceptions of the use of the forum, its effectiveness, its importance to their professional development, and the impact the forum has had (if any) on their teaching and their students' learning. This section of analysis is based on the voices of the participating teachers, sharing their opinions and perceptions over time.

III. What issues/problems do elementary teachers raise about the teaching and learning of mathematics in this online discussion forum?

This question ties the content of the forum back to the teaching of mathematics through repeated examination of the online messages. This analysis will provide a rich description of what the teachers are saying about mathematics in their classrooms and how the professional development program might be influencing their teaching and, possibly, their students' learning.

Examination of the data generated by the participants in this online forum is facilitated by a consideration of how they fit into the context of computer-mediated communication. Although this focus is a relatively new area for research and description, there is a burgeoning literature surrounding its use which has informed both the development of this project and the analysis of the data it generates.

Computer-Mediated Communication

Increasingly, computer-mediated communication (CMC), including online discussion forums, is being used to facilitate learning for many different groups of people, including teachers. Computer-mediated communication is defined as "communication across distances using personal computers, modems, phone lines, and computer networks" and possesses characteristics of both written and spoken discourse (Schrum, 1992, p. 50). Most discussion forums are asynchronous, meaning that the participants do not need to use the forum simultaneously, and there is a lag between posting and replies. Another characteristic of these forums is that conversation takes place entirely through the written word, which has an impact on communication (Zorfass, Remz, Gold, Ethier, and Corley, 1998). Although most forums began as email-based listservs, they are increasingly moving toward World Wide Web-based environments that allow archiving of messages, often with search and sort capabilities, and adding of links to other web sites. Discussions in these forums may be open-ended and unmoderated, open-ended and moderated, or they may exist for a set time, such as in an online course.

Although the use of online discussion forums as a form of professional development for teachers is becoming more popular, little is known about the learning it might promote. Online forums are often viewed through a social constructivist framework, in which participants jointly construct knowledge which is, in part, mediated by the use of technology as a tool (e.g. Blanton, Moorman, and Trathen, 1998; Nicaise and Barnes, 1996; Ravitz, 1995). Kowch and Schwier (1997) propose the use of online communication to construct virtual learning communities by attending to four specific components, i.e., negotiation, intimacy, commitment, and engagement. Negotiation involves the participants constructing the purposes, norms, and participation levels for the discussion. Participants also should be able to achieve a level of intimacy with other participants that is comfortable for them. Commitment to the group and its purpose is an important component; the stronger the commitment, the stronger the community. Finally, engagement of the participants should be based on influence and preference, rather than

power. These four components can lead to meaningful communication, the basis of building a learning community. Discussion forums may or may not become "learning communities," but there is support in the literature for benefits of their use.

Benefits of Computer-Mediated Communication

By far the most often cited benefit of CMC is the flexibility and convenience of participation (e.g. Bull, Harris, Lloyd, and Short, 1989; Lowry, Koneman, Osman-Jouchoux, and Wilson, 1994; Phillips and Santoro, 1989; DeWert, Babinski, and Jones, 1998). Discussion forums can be accessed at any time, and the user can choose when to respond to messages (Spitzer and Wedding, 1995). There is no need for participants to add face-to-face group meetings to their busy schedules (McMahon, 1997), and, if the participants already do meet as a group, they are able to participate in the experience outside of normal group meetings (Ahern, Peck, and Laycock, 1992). Not being tied to a specific place or time to converse with others is a primary attraction of CMC (Levin, Waugh, Brown, and Clift, 1994).

There is evidence that CMC can aid the quality of a group discussion. The nature of online discussion may promote reflection (Casey and Vogt, 1994; Spitzer and Wedding, 1995). The conversation is self-paced, so participants have time to reflect on their contributions and those of others (Lowry et al., 1994). There is time to consider and revise responses (Ahern et al., 1992), and the public nature of the discourse enforces responsibility about what is written (Phillips and Santoro, 1989). When well-done, asynchronous CMC may be valuable for group discussion even when face-to-face discussion is possible. Romiszowski and de Haas (1989) found evidence that participant involvement is "wider, deeper, and longer lasting" (p. 13) online than in face-to-face groups.

In addition to the educational quality of the discussion, interpersonal benefits of CMC have been identified. It may be easier to "speak up" online than in a classroom, and online discussion may encourage shy people to participate in ways they might not in face-to-face discussion (Lowry et al., 1994; Phillips and Santoro, 1989). A safe, nonthreatening environment can be nurtured online (DeWert et al., 1998) which, according to Casey and Vogt (1994), results in increased rapport and self-esteem. For teachers especially, this environment helps reduce the isolation associated with teaching (Bull et al., 1989; Casey and Vogt, 1994; McMahon, 1997). There also may be a reduction in the effect of status of the participants, allowing a more democratic discussion (Ahern et al., 1992).

Other benefits of online discussion involve the logistics that are enhanced by technology. A written record of the discussion is maintained and can be archived for further reference (Lowry et al., 1994), and automatic copying and filing of documents is easy for individuals (Phillips and Santoro, 1989). Technology allows responses to an individual or to the whole group at one time (Bull et al., 1989), which contributes to the convenience of communication. These are a few of the current logistical benefits of CMC; others are being identified which continue to make the use of technology attractive.

Drawbacks of Computer-Mediated Communication

There are some drawbacks to the use of CMC and obstacles to effective communication. Although there are a great many hopes about the educational value of online communication, often participants' actual experiences may be less than satisfying (McMahon, 1997). The main criticisms of CMC that emerge can be categorized as interpersonal concerns, confusion, technology, and time.

Interpersonal concerns stem from the permanence of written communication and the "facelessness" of CMC. Zorfass et al. (1998) found that participants may not want to post for fear of not sounding "intelligent" or because they don't feel as comfortable expressing themselves in writing as they would verbally. They also might not want to leave a permanent record of their messages (Davie, 1989). Once they do write, if no one responds to their posting, they may feel discouraged (Romiszowski and de Haas, 1989). Because there are no social cues as there are in face-to-face communication (e.g. nodding, smiling, frowning), social insecurities may be furthered and attempts at humor become especially difficult (Romiszowski and de Haas, 1989; Zorfass et al., 1998). In addition, the lack of importance of individual status is evident only in the early phases of participation because the participants tend to attach characteristics to the writers of certain messages which lead to differences in status (Romiszowski and de Haas, 1989). These uncertainties may lead to the need for the group to construct online social norms to facilitate discussions (Ahern et al., 1992).

The online environment can lead to confusion mainly through the volume and organization of the discussion. Participants need to be able to live with a bit of uncertainty, perhaps feeling "lost" at times (Burbules, 1996; Ahern et al., 1992). Because of the continuous and asynchronous nature of the conversation, participants may have some difficulty in following discussions and keeping track of where they are within a discussion, although advances in interface and software design are improving this problem (Davie, 1989). Also because of the delay in responding, the discussion can appear disjointed and may have moved on before some have a chance to respond (Lowry et al., 1994). It also becomes easy to drift in a discussion as different aspects of a topic are addressed by different participants at different times (Romiszowski and de Haas, 1989).

Inevitably, the use of computer technology raises technical problems for the users. Lack of user training and support, as well as lack of access to the appropriate technology, are major reasons for the failure of online projects (e.g. Casey and Vogt, 1994; Davie, 1989; McIntyre and Tlusty, 1995; Phillips and Santoro, 1989). Although time is a primary benefit of CMC, many find that they do not have time to keep up with the volume of messages posted (e.g. Hoover, 1994; Kimball, 1995; McMahon, 1997). The press of other responsibilities often prevents the participation of even those who are interested in and committed to the online conversation (McIntyre and Tlusty, 1995). In addition, the workload on the instructional staff or facilitators is high as they strive for constant attention to participants' messages (Phillips and Santoro, 1989). Although technical access and support for CMC is growing, unless participants find (or make) the time to participate fully, it cannot be successful.

Support Needed for Successful Online Communication

In order to maximize the benefits and minimize the drawbacks of the use of online forums to advance knowledge and understanding, it is important to consider the types of organization and facilitation that promote successful online learning. The first type of support that is necessary for a successful forum is technical/logistical assistance. Access to computers, modems, and online accounts, especially at home, is often mentioned as a primary factor in the success of a discussion forum (Hunter, 1990; McMahon, 1997), as well as technical training and assistance in solving technical problems (Bull et al., 1989; McMahon, 1997; Robin, 1994). Interface design is also important; it should be simple, user-friendly, encourage collaboration, and allow for growth and change (Bull et al., 1989; Pattison-Gordon, 1997; Robin, 1994). Burbules (1996) stresses that accessibility is the most basic level of what is necessary for CMC, "having the time, the knowledge, the skills, and the attitudes that make actual use possible" (p. 29).

Simply having the technology, however, is not enough to promote learning online. It is necessary to have a vision of the kind of community that is desirable for the learning context (Hunter, 1990; Yan, Anderson, and Nelson, 1994). The success of an online discussion forum is dependent upon the type of environment that is created by the facilitator and participants. A key component of that environment is commitment to a shared task or joint work (Hunter, 1990; Jervis, 1992; Kimball, 1995; Pattison-Gordon, 1997), which is often constructed by the group themselves. The group should develop a supportive, non-evaluative culture of collaboration where the participants feel secure, comfortable, and that they really know the other participants (Pattison-Gordon, 1997). Online conventions such as emoticons [:-)] or expressions such as BTW (by the way) serve to help bond participants, but must be shared with new members to avoid feelings of exclusion (Burbules, 1996).

Ravitz (1995) describes the Joint Activity Model (Curtis, 1995, in Ravitz, 1995), which is comprised of three features necessary to create a sense of "place" for online participants: co-presence, flexible participation, and rich structure. Co-presence is the ability to make meaningful contact with others, often for moral support and to reduce isolation. Flexible participation is fostered by the asynchronous nature of CMC and the ongoing record of discussions which allows someone to enter a discussion after is has already begun and not lose anything. Rich structure is necessary in order to deal with the sometimes overwhelming numbers of messages and also to provide easy retrieval of current and past messages. This Joint Activity Model is useful as a tool for planning new online projects, as well as examining existing ones.

Riel (1989) offers a more expansive framework of features to consider in order to create a successful online community: organization of the group, network task organization, response opportunities and obligations, and coordination and support. In considering the organization of the group, it is important to take into account the number of participants and whether that number will fluctuate greatly. The participants may interact only electronically or have face-to-face meetings in addition to the online communication. These face-to-face meetings may take the form of a shared experience, such as a class, conference, or project. In considering network task organization, attention

should be given to the goals of the group and who sets them, the duration of the task and timeline for completion (if there is a time limit and specified task), and the types of activities that will be used to engage the participants. In considering response opportunities and obligations, the expectations for participation should be established in advance, ideally with the input of the participants. Ease of access and expertise to use the necessary technology must also be provided for. Finally, in considering coordination and support, provisions should be made for both technical support as well as support for the goals and/or curriculum associated with the project. Economic resources provided by participants or other sources are necessary in order to provide this support. By examining these dimensions of online community-building and deciding how each pertains to the development of a particular project, educators can effectively plan for online learning.

A key to developing and maintaining the discussion group is the presence of a facilitator or moderator. Throughout the literature, emphasis is placed on facilitation to sustain online discussion and learning. The following strategies for effective facilitation are synthesized from a variety of sources (Ahern et al., 1992; Berge, 1996; Kimball, 1995; McMahon, 1997; Pattison-Gordon, 1997; Robin, 1994; Romiszowski and de Haas, 1989; Spitzer and Wedding, 1995; Zorfass et al., 1998). A facilitator should:

- create a welcoming, supportive environment with the first message and topic
- model expected behavior and message writing; use a relaxed, conversational style without an emphasis on grammar, spelling, etc.
- acknowledge participants by name, and refer to their messages
- establish guidelines and expectations for participation, preferably with the participants
- explicitly state the kind of atmosphere it is hoped will be developed
- positively reinforce efforts at participation
- provide leading questions, ask for clarification, and probe with questions
- email participants individually to encourage participation
- refocus discussions to keep participants on track
- contribute to the discussions
- make sure participants receive timely responses to their postings
- point out questions or issues that haven't been responded to
- show how one person's ideas connect to others' ideas to help construct group understanding
- comment on group progress and processes
- summarize and synthesize postings to draw together main themes
- help adjust the pace if there are too few or too many messages
- pay attention to who is participating and how much they are participating
- focus on what is actually happening in the group rather than what was hoped or expected to happen
- ask for critique of the online experience

It may also be helpful to give the following tips to participants for successful participation (Zorfass et al., 1998):

- post often, even if short, just to let others know you "hear" them
- ask lots of questions about the discussion forum process and content

- try to check in every day
- don't worry about grammar, spelling, etc.

By capitalizing on the benefits of CMC, avoiding its drawbacks, and focusing on the elements of successful online discussion groups, those who create groups are likely to advance the knowledge and understanding of participants. Just as the use of online discussion forums is only beginning, however, so is research into their effective use. In most cases, examination of online discussions is done through content analysis of the participants' postings. For this type of analysis, the unit of analysis is a single message, and these messages are examined for emerging themes regarding the topics of the postings. Previous studies of teachers and student teachers have found topical themes such as:

- peer support and encouragement, sharing information with each other, reflecting on the field experience, debating controversial issues, discussing the course (Powers and Dutt-Doner, 1997)
- combating frustration with camaraderie and support, promoting a focus on content-specific pedagogy, forging the way toward critical inquiry into practice (Hoover, 1994)
- reflections on: adapting lesson plans, content/subject matter knowledge, teaching strategies, anxiety and stress in teaching, class management, student teaching experience, sharing solutions to problems, parent/teacher conferences, admitting they were wrong/not knowing everything, sexual harassment (Yan, Anderson, and Nelson, 1994)
- individual students, policy and politics, technical issues, classroom management, me as teacher, working with adults, curriculum and instruction (DeWert, Babinski, and Jones, 1998)

In general, these studies have found that it is essential to resolve technical and access difficulties, but that, if these are resolved, online communication is effective for connecting educators both professionally and personally. There is still a great deal of research and analysis to be done, however, to further understand how this technology fits into our students' and teachers' lives.

Analysis of Data

A preliminary analysis of the first three months of the discussion forum has begun. Usage data show participation in the forum (measured by numbers of postings) at about the same levels in the first two months then declining in December, possibly due to the holiday season (see Figure 1).

	October	November	December
Total # postings	114	118	57
Avg. # postings per day	3.93	3.93	1.84
Avg. # postings per participant	5.21	6.36	3.14

Figure 1. Summary Usage Data for First Three Months of Discussion Forum

Although analysis of the specific messages will continue in much more depth throughout the coming months, several interesting "conversations," (postings by various people on the same topic) related to the teaching and learning of mathematics have already emerged.

One of the earliest conversations about the teaching of mathematics began with the facilitator, Bev, a university professor who is leading the professional development program, introducing an issue regarding her experiences with children solving types of problems know as "Join Change Unknown" (see Hiebert et al., 1997 for a discussion of this and other problem types).

> I know...I know!!! You haven't even caught your breath with getting on the computer and already I'm getting task oriented. But, hey, if you're reading this, you're a computer star!!!! Welcome to our time togethe I'm really looking forward to having a chance to "talk" more often about lots of things.
>
> I've put this up because I've been having a time with this kind of problem. I'm teaching about once a week in a second grade class. The teacher is a great sport ... hasn't been through a math development workshop but has done some of our reading and is eager to explore using the word problems with her children. We've been experimenting with problems. One at the very beginning was:
>
> Bill has 2 snowballs. Jean gave him some more snowballs. Now he has 9 snowballs. How many snowballs did Jean give him?
>
> This was really interesting because a few kids could definitely do it (we had them doing this one in their journals); many more were shaky and didn't really seem to understand. For example, one boy got out two cubes stacked together ... then got out 9 cubes stacked in sets of 2, 2, 2, 1. He wanted to join both (as did many others) to make 11.
>
> Well, the teacher, experimented with modifying the wording of the problem to "How many more snowballs did Jean give him so he now has 9 snowballs?" Then more children solved it. But there were still several who didn't "get it."
> So next time, we tried another JCU using numbers that were "closer together":
>
> Sarah has 4 pieces of candy. Matthew gave her some more pieces of candy. Now Sarah has 6 pieces of candy. How many pieces of candy did Matthew give her? (By now we are using names of children in the class in the story problems).
>
> More kids could do this...especially when we used the teacher's rewording like she did the week before. Then we changed the numbers so they were 3 and 5...and more kids did get it. BUT there are now clearly 3 children who stand out as not getting this type of problem at all. So we're going to back track with them.

Following this, I talked with someone who had worked with CGI in Wisonsin, and she verified that we can experiment by changing the number sizes and/or by "elaborating" or "rewording" problems to help children make sense. Each time we did this in the class, I worked not to literally walk the child through the steps I thought he/she should do. I worked to make the problem accessible, but not to push solution if he/she didn't understand.

We've also tried a few multiplication problems...and division. Again, these are pretty accessible...kids mostly directly model at this point in second grade. But I know that they do different things by third grade. ANYWAY, wondered if you had any experiences to share like this one. OR questions to raise?
(Bev, 10/4)

Although there were several responses to this posting, they were very general and, while they mentioned classroom activities, they did not get into specifics of children's (or teacher's) thinking.

When I began this type of problem with my students this year I used their names in the problem and, we used the "act it out" strategy. They had a great time being actors! Then I had them write their own Join Change Unknown problems in cooperative groups. As I monitored these groups and read their JCU's it gave me some pretty creative ways to change the wording for their understanding. It was fun to watch them exchange their problems and challenge their classmates with larger numbers.
(Nancy, 10/4)

The facilitator tried again, prompting the participants for more detail.

This sounds neat. Can you give us some specific examples and include ways students' thought about solving these types of problems. I'm a real "gotta see it to understand" person...so examples ... cases of your kids' work would help me a lot.
(Bev, 10/5)

Another teacher responded and began to include classroom examples which helped to identify children's specific strategies.

bev, i told you that i would try the JCU problem that you tried with your 2nd graders. i did it last week but i gave my third graders a choice of numbers to use. i knew some of my students needed the challenge of harder numbers and i feel it's part of my responsibility as a teacher to give them that challenge. surprisingly, however most of my students chose to use the larger numbers. only 3-4 chose to use 2 and 9. my problem read....

Bill has 2 25 snowballs. Jean gave him some more snowballs. Now he has 9 51 snowballs. How many snowballs did Jean give him?

unfortunately, i have left my specific results at school but i will tell you basically what happened. i had 3-4 who got it correct the first time using the large #'s. they were the students i felt needed the challenge of larger #'s. i had one who got it correct the first time using the smaller #'s. most students got it correct when they went to their seats and tried a second time. their were a few who had to try more than twice even using the small #'s. i made a point of seeing that those students explained how they got their answer when we did our sharing/explaining time together.one of them had a little trouble remembering how he got his answer but he had used beans and he finally was able to explain.

bev, you'll love this... a little boy that i wouldn't have expected this response from, explained his answer this way (using 25 and 51). i knew that 25 plus 25 was 50 so i added 1 to the 25 and got 26. he did it all in his head... which proves we should never limit our expectations of our students... they might surprise us!!!
(Diane, 10/10)

Many conversations followed a similar pattern with the facilitator introducing topics and ideas, participants responding, facilitator probing, then participants either responding in more depth, or seeming to ignore the facilitator's probes and moving on to another topic. As the months progressed, topics became more and more teacher-initiated, such as Jessica's description of practicing mental math strategies with her students.

Today, most of my students had an eye-opening experience. After packing up to go home, we still had quite a few minutes before the bell rang. I decided to make the most of it and started asking them some basic 2-digit math problems ie. 34+12= 47-15= etc. (Boy you should have seen all those fingers flying.) One of my students was always the first one with his hand up, and I continued to call on him for the answers. Of course the other students began to get a little frustrated with this and finally one spoke up. "We can't do it as fast as he can." "Why not?" I asked her. She just shrugged. So I asked the young man if he could tell us how he was getting the answers so fast. (As he told them, I wrote what he was saying on the overhead.) It looked like this:
34+12= 47-15=
34+10=44 47-10=37
44+2=46 37-5=32

Some of the students didn't understand how he could separate the tens from the ones, but after I showed them using the uni-fix cubes, most of them were able to

catch on. I then wrote about 5 more problems on a sheet of paper and let the young man call them out to the class. He enjoyed having that responsibility and the students enjoyed trying to solve the problems "his way." Unfortunately, I still had a few trying to do it with their fingers, but most of them were able to get the answers a lot quicker with this new strategy. I plan to do this little exercise more often. :-)
(Jessica, 10/13)

The facilitator responded with encouragement and sharing of other strategies, then teachers began to share strategies and ideas. Although several teachers responded, the facilitator still made half of the postings related to this topic, mostly prompting for more detail, sharing information, and offering encouragement.

Hooray....we've had Jessica share strategies. NOW, we've got a lot of different strategies that Nancy shared. This is great! I know I sound like a "stuck record"...but once we begin sharing strategies, we can talk about what we know about their thinking...and kinds of problems we might use next. SO, for example, Nancy described one strategy:

Use 100's board. Start with sixteen and count the numbers until you reach 30.

This tells us that some of the students are familiar with the 100's board. Do any of you recall the game we played this summer using the 100's board called "Plus-Minus-Stay the Same" (it was the tan sheets of paper...Diane, you got yours later). It may be that you want to use this game with students as an activity to promote thinking about 10's...in addition to using more CGI problems.

The two students she also described below are at the derived fact level...wonder how they do with other kinds of CGI problems with numbers in the same range? Are they doing derived facts in all cases...some cases?

Start with 16. Add 10 to get 26. Add 10 more to get 36.
Then subtract 6 back to 30.
Write the problem 30 - 16 = 14

Anyway, this is just some of my thinking as I read your discussion. Thanks so much for sharing all this! Sounds like you may have begun a notebook like Diane has...recording the problem and the kinds of solutions strategies? This is great!
(Bev, 10/19)

It begins to become apparent that many of the same teachers contribute to the forum over and over, while others participate very little. In fact, one of the teachers has participated only twice in three months, and another three times. Future interviews will

hopefully uncover some of the teachers' perceptions about participation and non-participation in the forum.

These messages just begin to provide a glimpse into the interactions among the teacher participants and facilitator on the forum. Aside from the postings which specifically deal with the teaching of mathematics, participants have shared other ideas and activities with each other, both personal and professional. We have read of future grandchildren, weddings, trips, and workshops, along with daily classroom frustrations and successes. It appears that analysis of the data generated over the course of the entire school year will provide insight not only into how these teachers make sense of teaching mathematics, but also how they support and share with one another as a learning community.

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